

WHAT IS CLAIMED IS:

1 1. A method for transmitting a stream of digital data values, comprising:
 2 modulating a carrier wave to carry symbols representative of successive digital
 3 data values, symbols representative of successive ones of the digital data values
 4 interfering more in the modulated carrier wave than in a reference wave transmitting the
 5 same symbol rate as the modulated carrier wave, the modulated carrier wave having a
 6 narrower spectral width than the reference wave, the reference wave being produced by
 7 modulating the same carrier wave with one of the digital data values at a time and having
 8 an effective symbol rate more than twice as great as the modulated carrier wave.

1 2. The method of claim 1, wherein the modulating a carrier wave includes
 2 amplitude modulating the carrier wave with a non-return-to-zero waveform whose
 3 amplitude is sequentially defined from successive values of the symbols.

1 3. The method of claim 1, wherein the modulating a carrier wave includes
 2 amplitude modulating an optical carrier.

1 4. The method of claim 3, wherein the modulating includes amplitude
 2 modulating the carrier wave with a non-return-to-zero waveform whose amplitude is
 3 sequentially defined from successive values of the symbols.

1 5. The method of claim 1, wherein the digital data values are data bits.

1 6. A method of transmitting a stream of digital data values, comprising:
 2 generating a stream of symbols by processing the digital data values with a partial
 3 response function defined by $[1 + \sum_{i=1}^K Z^{-i}]$, the integer K being greater than one, and the
 4 functions Z^{-i} delaying the digital data values by i times the period between successive
 5 ones of the digital data values; and
 6 modulating a carrier wave with the generated stream of symbols.

1 7. The method of claim 6, wherein the modulating includes amplitude

2 modulating the carrier wave with a non-return-to-zero waveform whose amplitude is
3 sequentially defined by a sequence of the symbols.

1 8. The method of claim 6, wherein the modulating includes amplitude
2 modulating an optical carrier.

1 9. The method of claim 8, wherein the modulating includes amplitude
2 modulating the carrier wave with a non-return-to-zero waveform whose amplitude is
3 sequentially defined by a sequence of the symbols.

1 10. The method of claim 6, wherein the integer K is odd.

1 11. The method of claim 6, wherein the digital data values are data bits.

1 12. A transmitter of digital data, comprising:
2 a modulator having an input for a carrier signal and an input for a first stream of
3 symbols representative of digital data values, the modulator to modulate the carrier signal
4 with sequential values of symbols of a second stream, each symbol of the second stream
5 being a sum of the present symbol and the last K symbols of the first stream, the integer
6 K being greater than one.

1 13. The transmitter of claim 12, wherein the modulator processes the symbols
2 of the first stream with a partial response function defined by $[1 + \sum_{i=1}^K Z^{-i}]$, and the
3 functions Z^{-i} delaying symbols by i times the period between successive ones of the input
4 symbols.

1 14. The transmitter of claim 12, wherein the modulator modulates the carrier
2 signal with a non-return-to-zero waveform whose amplitude is sequentially defined by
3 the sequence of symbols in the second stream.

1 15. The transmitter of claim 12, wherein the modulator is configured to
2 modulate an optical carrier.

1 16. The transmitter of claim 15, wherein the modulator modulates the optical
2 beam with a non-return-to-zero waveform whose amplitude is sequentially defined by the
3 sequence of symbols in the second stream.

1 17. The transmitter of claim 12, wherein the integer K is odd.

1 18. The transmitter of claim 12, wherein the digital data values are data bits.

1 19. A receiver, comprising:
2 a detector to receive a modulated carrier signal from a transmitter; and
3 a mapper configured to use the received signal to determine values of input digital
4 data values associated with a stream of input symbols that the transmitter used to
5 modulate the carrier signal, the carrier signal being modulated by a stream of control
6 symbols formed by processing the stream of input digital data values with a partial
7 response function defined by $[1 + \sum_{i=1}^K Z^{-i}]$, the integer K being greater than one, and the
8 functions Z^{-i} delaying the input digital data values by i multiplied by the time between
9 successive ones of the input digital data values.

1 20. The receiver of claim 19, wherein the detector determines optical
2 intensities.

1 21. The receiver of claim 19, wherein the mapper includes an inverse
2 constellation mapper based on a constellation of transmission symbols in which at least
3 two of the transmission symbols correspond to the same value for ones of the input data
4 values.

1 22. The receiver of claim 19, wherein the input digital data values are data
2 bits.

1 23. A receiver, comprising:
 2 an amplitude detector to receive a carrier wave and to determine a sequence of
 3 values representative of amplitudes of the received carrier wave; and
 4 an inverse constellation mapper to estimate a sequence of input digital data values
 5 based both on the sequence of determined values and on a relation between amplitudes
 6 of a symbol constellation and values of the input digital data values used to modulate the
 7 carrier wave, the relation associating at least two amplitudes of the constellation to the
 8 same value of an input digital data value.

1 24. The receiver of claim 23, further comprising:
 2 an optical filter to select a frequency band, the detector coupled to receive the
 3 carrier wave belonging to the selected frequency band from an output of the optical filter.

1 25. The receiver of claim 24, wherein the detector detects one of visible and
 2 near infrared light.

1 26. The receiver of claim 23, further comprising:
 2 a slicer to receive the determined sequence of values from the detector and to send
 3 new values of amplitudes representative of symbols of the constellation to the mapper
 4 based on the received values.

1 27. The receiver of claim 26, wherein the detector is configured to detect a
 2 carrier wave in a wireless channel.

1 28. The receiver of claim 23, wherein the input digital data values are data
 2 bits.

1 29. The receiver of claim 23, wherein the values representative of amplitudes
 2 are measured intensity values of the received carrier wave.